THE INSTITUTE OF PHYSICS

47 BELGRAVE SQUARE, LONDON, S.W.1

BULLETIN

No. 16 *Information in this circular is not intended for general publication: your copy should not therefore be passed to a library.* APRIL 1951

DIARY OF INSTITUTE MEETINGS

Members may bring guests to any of the meetings listed below unless otherwise indicated. Individual notification has been or will be sent to the members of the Branch or Group concerned. Other members of the Institute may obtain further particulars from the Secretary of the Institute.

Thursday, Friday, April 12th, 13th (X-Ray Analysis Group), Spring Conference at Ashorne Hill, Leamington Spa. **"The Texture and Structure of Metals."** Full particulars are available on request.

Friday, April 27th (South Wales Branch), at 8.0 p.m., at the University College, Aberystwyth. **Professor P. B. Moon, F.R.S. "Some Applications of High Speed Rotation."**

Wednesday, May 16th, at 5.30 p.m., at the Institute's House, 47 Belgrave Square, London, S.W.1. **Institute Annual General Meeting.**

THIRTY-FIRST ANNUAL GENERAL MEETING

NOTICE IS HEREBY GIVEN that the Thirty-First Annual General Meeting of The Institute of Physics will be held at 5.30 p.m. on Wednesday, May 16, 1951, in the Institute's House, 47 Belgrave Square, London, S.W.1. Attendance is limited to Fellows and Associates of the Institute. The business to be conducted is the consideration of the Board's report, the accounts and balance sheets for 1950, the declaration of the election of the Honorary Officers and other members of the Board nominated, and the election of auditors. A copy of the annual report and accounts is printed in this issue of the *Bulletin*. Further copies will be sent on request.

B. P. DUDDING,
Honorary Secretary.

NOTICE TO MEMBERS

Part-time Employment for Retired Members

The regulations of universities, the Civil Service and other organizations commonly require men and women to retire at a fixed and comparatively early age at which they are often still able and indeed anxious to continue to use their knowledge and experience, although perhaps not wishing to be tied to full-time employment. From time to time the Secretary is approached informally to see if he can suggest appropriate work to them. Heads of industrial and other laboratories have also approached the Secretary with a view to his suggesting names of senior Fellows who might give them occasional advice or help and, in this way, it has been possible to arrange some informal contacts from which mutually satisfactory arrangements have followed.

The Board has received a report on this position in general terms. It was felt that it might be possible to develo this kind of arrangement in a confidential manr ccordingly, Fellows who might know of part-time work suitable for a retired senior member of the profession are asked to inform the Secretary in confidence. The kind of work envisaged might take the form of occasional visits to a research laboratory to discuss problems with the individual members of the staff, consulting and design work on specific problems, the preparation and editing of technical literature and books or examining work.

"A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it."

MAX PLANCK.

REPORT OF THE BOARD OF THE INSTITUTE OF PHYSICS FOR THE YEAR 1950

The Board and its Committees

The present Board took office on October 1, 1950; its Members are:

President: Prof. W. E. Curtis.

Past Presidents: Dr. F. C. Toy, Prof. A. M. Tyndall.

Vice-Presidents: Mr. D. A. Oliver, Dr. T. E. Allibone. Dr. S. Whitehead, Prof. E. G. Cox.

Honorary Treasurer: Mr. E. R. Davies.

Honorary Secretary: Dr. B. P. Dudding.

Ordinary Members of the Board: Mr. J. H. Awbery, Dr. F. P. Bowden, Dr. T. L. Ibbs, Mr. T. C. Keeley, Mr. G. R. Noakes, Dr. H. L. Penman, Mr. E. W. H. Selwyn and Dr. J. Topping.

Chairmen of Branches in Great Britain: Dr. A. J. Maddock (London and Home Counties), Prof. F. A. Vick (Manchester and District), Dr. D. Parkinson (Midland), Mr. H. G. Yates (North Eastern), Prof. J. S. Rankin (Scottish), Dr. T. V. I. Starkey (South Wales).

Appointed by Participating Societies: Mr. W. A. Langmead (British Institute of Radiology), Dr. H. H. Hopkins and Dr. A. C. Menzies (Physical Society), Prof. H. W. Thompson (Faraday Society), and Dr. G. D. Robinson (Royal Meteorological Society).

The Board and Committees

During the year the Board met six times and appointed the undermentioned Standing Committees which held twenty-one meetings.

	Chairmen
Finance and General Purposes Committee	The Honorary Treasurer
Membership Committee	Dr. J. Topping
Education Committee	Prof. F. Llewellyn Jones
Benevolent Fund Committee	The Honorary Treasurer
Publications Policy Committee	The President
House Committee	The Honorary Treasurer
Advisory Committee of the British Journal of Applied Physics	The President
Advisory Committee of the Journal of Scientific Instruments	The President

Representatives on Joint Committees and other Bodies

The Institute has been represented as follows:*

On the Royal Society's National Committee for Physics: Mr. J. H. Awbery.

On the Royal Society's National Committee for Crystallography: Prof. E. G. Cox.

On the Royal Society's Paul Instrument Fund Committee: Sir Frank Smith.

On the Joint Council of Professional Scientists: The President, Dr. H. R. Lang and Dr. S. Whitehead.

On the Parliamentary and Scientific Committee: Dr. B. P. Dudding and Dr. H. R. Lang on the General Committee, together with Mr. W. A. Langmead and Dr. A. J. Maddock at the Annual Meeting.

On the Parliamentary and Scientific Committee's Sub-Committee on Technical Education: Dr. J. Topping and Mr. N. Clarke.

On the City and Guilds of London Institute Committee on the Education and Training of Laboratory Technicians: Mr. N. Clarke, Mr. L. Walden and Dr. R. S. Clay.

On the City and Guilds of London Institute Committee on Instrument Mechanics and Technicians: Mr. N. Clarke.

On the Joint National Certificates Committee with the Ministry of Education: Mr. D. A. Oliver, Dr. B. P. Dudding, Mr. E. W. H. Selwyn, Dr. J. Topping and Mr. W. S. Vernon.

On the Joint National Certificates Committee with the Scottish Education Department: Prof. P. I. Dee, Dr. R. S. Silver and Dr. A. G. White.

On the Joint Library Committee with the Physical Society: Mr. N. L. Harris, Mr. F. I. G. Rawlins, Dr. J. S. Forrest and Mr. N. Clarke.

On the British Committee for Radiological Units: Mr. W. Binks.

On the Joint Committee for Chemical Analysis by X-ray Diffraction Methods: Prof. W. P. Davey.

Royal Society's Panel on Presentation of Information: Dr. H. R. Lang.

Royal Society's Information Services Committee: Dr. H. R. Lang.

On the Royal Society's Committee of Editors: Dr. H. R. Lang.

On the Physics and Mathematics Advisory Committee of the Ministry of Labour: Dr. F. C. Toy and Dr. H. R. Lang.

On the London and Home Counties Regional Advisory Council for Higher Technological Education: Mr. F. Twyman.

* Summaries of the work of these Committees, supplied by the representatives on them, when not referred to in the Report, will be found in the Appendix.

On the Applied Science Advisory Committee of the Royal Technical College of Salford: Dr. R. Witty.

On the Advisory Committee of the Ipswich School of Technology: Mr. H. A. Nancarrow.

On the Committee of the Council of Industrial Design for the Selection of Scientific Instruments for Display at the 1951 *Festival of Britain:* Mr. A. G. Peacock.

On the Sub-Committee on Specialist Courses in Electrical Engineering of the Welsh Academic Board of Technology: Mr. W. S. Vernon.

On the Science Advisory Committee of the Blackburn Technical College: Dr. A. Hargreaves.

British Standards Institution: The Institute has been represented on a number of technical committees and sub-committees of the B.S.I.

At the International Conference on Nuclear Physics: Dr. T. E. Allibone.

At the Celebrations of the 50th Anniversary of the Discovery of Radium held in Paris: Prof. W. V. Mayneord.

The Register

TABLE I.—THE ROLL OF THE INSTITUTE

	Total on Dec. 31, 1949	CHANGES DURING 1950								*Total on Dec. 31, 1950*
		New	*Transfers to*	*Readmitted*	*Resigned*	*Deceased*	*Removed*	*Transfers from*	*Net inc. or decrease*	
Honorary Fellows	4	—	—	—	—	—	—	—	—	4
Fellows	872	15	23	1	5	11	4	—	+ 19	891
Associates	1 376	85	87	1	42	5	1	23	+ 102	1 478
Graduates	54	116	127	1	2	—	3	10	+ 229	283
Companions	—	—	—	—	—	—	—	—	—	—
Subscribers	547	58	—	2	103	4	22	7	− 76	471
Students	804	189	—	—	43	1	21	197	− 73	731
	3 657	463	237	5	195	21	51	237	+ 201	3 858

Deaths.—The Board records with regret the deaths reported in 1950 of:—

Founder Fellows: A. J. Bull, J. A. Crowther, Sir James Henderson, H. Shaw, G. W. Todd. *Fellows:* G. T. R. Evans, E. Mallet, E. A. Milne, J. H. G. Monypenny, F. T. Peirce, J. S. van der Lingen. *Associates:* J. E. Bocking, M. T. Denne, D. Freeman, N. L. Phalnikar, I. Waddle. *Subscribers:* R. G. Manley, B. Patel, G. Pearce, H. C. M. Stevens. *Student:* J. I. Myers.

Death of Professor J. A. Crowther (Vice-President).

Professor J. A. Crowther, whose death is recorded above, served on the Board continuously from 1930 until his death, having been Honorary Secretary from 1932–46, when he was elected a Vice-President. He was Chairman of the Industrial Radiology Group from its formation in 1941 until 1945. A tribute to his great work for the Institute was published in the May issue of the BULLETIN.

Expulsion.

The Board regrets to have to record that in accordance with Article 12 the membership of a Fellow who had been convicted of a criminal offence was terminated.

Membership Committee

During the year the Committee received 627 applications for election or transfer to the various grades, compared with 652 in 1949. The numbers for the grades (1949 figures being given in brackets) were: Fellows 36 (37), Associates 131 (200), Graduates 213 (126), Students 204 (207) and Subscribers 43 (82).

The effect of the 1949 changes in regulations, the chief of which were the creation of the Graduate grade and the raising of the minimum ages and lengthening of the periods of experience for the Fellowship and Associateship grades, can be clearly seen from the above figures. During the year the Examining panel met three times and interviewed fourteen candidates.

The system of granting official recognition, after inspection, to suitable technical college has been continued by the Committee. Inspections are carried out by two Fellows and the Deputy Secretary of the Institute accompanied by one of His Majesty's Inspectors; the recommendations of the representatives have in several cases resulted in important improvements in the facilities of colleges. The number of recognized colleges is now thirty-three.

General Meeting

The 30th Annual General Meeting of the Institute was held on 20th July in the Institute's House. Besides the ordinary business, the deletion of By-Law 17 was agreed to, as special business. This By-Law related to compounding for annual subscriptions.

Education

Graduateship Examination.—The Board decided to establish an Institute Graduateship examination and requested its Education Committee to submit detailed proposals relating to it. During the year the Committee

almost completed the drafting of regulations and syllabuses.

National Certificates in Applied Physics.—For the first time candidates were presented for the Higher National Certificate in Applied Physics (by Northampton Polytechnic, London) and four of the six were successful. Of the sixty-four candidates in England and Wales for the Ordinary National Certificate, thirty-eight were successful; a further seven candidates were entered for the first examination to be held in Scotland, six being successful.

Education and Training of Laboratory Technicians.—The City and Guilds of London Institute's Advisory Committee on the Education and Training of Laboratory Technicians (on which the Institute is represented), published during the year its proposals for an appropriate examination to be held under the auspices of that Institute. In the opinion of the Board these proposals were very satisfactory and it was therefore decided to announce the discontinuance of the Institute's Certificate in Laboratory Arts when the students already enrolled in courses had had an opportunity of completing their studies. The Institute will not examine for this certificate after December 1951.

Parliamentary and Scientific Committee report on Education of Technicians.—The Institute was represented on the sub-committee of the Parliamentary and Scientific Committee which drafted the report "Technical Education and Skilled Manpower" and on the deputation to the Minister of Education to discuss the report's recommendations.

Higher Technological Education.—The Institute was asked by the Ministry of Education to submit comments on the report on Higher Technological Education prepared by the National Advisory Council for Education in Industry and Commerce. The Board submitted comments along the general lines of its own report on the Education and Training of Technologists and included a reasoned objection to the proposal to establish a Royal College of Technology. These comments were published in the December issue of the *Bulletin*.

Following the publication by the Ministry of a revised report on this subject, the Board availed itself of the invitation by the Minister to submit further comments.

Publications

Improvement of Scientific Literature.—The Board accepted the invitation of the Council of the Royal Society to assist in its effort to improve scientific literature by attempting to reduce the number of papers submitted for publication and at the same time having them written clearly and concisely.

It further ordered that the Royal Society's letter should be included in full in the *Bulletin* and attention called to the booklet entitled *General Notes on the Preparation of Scientific Papers*, prepared for the Royal Society, and also to the Institute's own *Notes on the Preparation of Contributions to the Institute's Journals and other Publications*. It was further agreed to inform the Royal Society that the Board was in complete sympathy with the views of its Council, and that the Institute's referees were always asked to pay particular attention to conciseness and lucidity in recommending publication or advising on modifications required before papers were accepted.

The Journals.—The plans to divide the *Journal of Scientific Instruments and of Physics in Industry* were carried through at the beginning of the year. The new *British Journal of Applied Physics* was thus established on the basis of the "Physics in Industry" section of the old Journal, which again became devoted entirely to scientific instruments and apparatus and reverted to its original title *Journal of Scientific Instruments*. The new Journal was well received and at the end of the year its circulation among members and non-members was very satisfactory. Members were given a choice of either Journal and were allowed to subscribe to the second one at a much reduced rate. Approximately one-third took both Journals, and slightly more of the remainder took the new Journal than the instrument one.

In the following figures the first number refers to the instrument Journal and the second to the new one. The 1950 volumes each consisted of the usual twelve parts issued monthly and comprised $354 + 340 = 694$ pages compared with the previous year's 427 pages in the one Journal. $123 + 63 = 186$ papers were submitted compared with 151 the previous year: of these $98 + 44 = 142$ were accepted, $50 + 22 = 72$ after modification to meet referees' criticisms. Sixty laboratory and workshop notes were submitted compared with 51 the previous year; 45 of these were accepted, 11 of which had first to be modified. $6 + 12 = 18$ specially invited articles were included in the volumes, most of them being based on lectures or symposia arranged by the Institute's groups and branches. Descriptions of 50 new instruments and tools recently put on the market were published and notices of 52 catalogues and booklets issued by instrument makers were given. Reviews or notices of $35 + 57 = 92$ new books were included in the volumes.

The Board wishes to place on record its thanks to all those who have assisted the Editor by acting as referees and in advising him on various matters, and to those who have reviewed books, or prepared accounts of new instruments and tools. It also wishes to record its sense of indebtedness to the Cambridge University Press, printers of the *Journal of Scientific Instruments* since its foundation in 1922 until the end of 1950. Since the expansion of the Journal after the war the Press has had some difficulty in handling it to schedule because of the increasing work of its own publishing house; for the last three years, therefore, the advertisement section has been printed in London by F. J. Milner and Sons Ltd., who kindly agreed to help temporarily in this way. Arrangements have now been made with Unwin Brothers Ltd., who are printing the *British Journal of Applied*

Physics, to take over the printing of both the text and advertisement sections of the *Journal of Scientific Instruments*. The Board appreciates the helpful co-operation the Editor and his staff have received from the Institute's new printers during the initial stages of the new Journal and of the taking over of the old one.

Bulletin.—The circulation to members of a monthly *Bulletin* was started in January; this replaced the occasional *Notes and Notices* circular, but in addition carried more than one hundred small advertisements of vacancies for physicists. This service was much appreciated by members and prospective employers and the income from advertisements contributed substantially to the cost of printing the *Bulletin*.

"*Physics in Industry*" *Monograph Series and Supplements to the Journals*.—The symposium arranged by the Electronics Group at the 1949 Buxton Convention was published in this series under the title *The Acceleration of Particles to High Energies*.

During the year the Board decided that future symposia held under the auspices of the Institute should be published either as supplements to one or other of its Journals or by an outside publisher, so that the "Physics in Industry" series could be devoted to specially commissioned monographs: the script of Mr. L. Rotherham's *Creep of Metals* was received in July and sent to press for publication early in 1951. Further monographs in the series were also commissioned.

Contributions to the symposium on "Physics of Lubrication" arranged jointly by the Manchester and District Branch and the British Rheologists Club after being refereed, revised and edited were sent to press for publication early in 1951 as the first Supplement to the *British Journal of Applied Physics*. Work on the preparation for the Press of the symposium on "Vacuum Physics" arranged by the Midland Branch was commenced, and this will be published in 1951 as a supplement to the *Journal of Scientific Instruments*.

Books.—Messrs. Edward Arnold and Co. agreed to publish the symposium on "Some Aspects of Fluid Flow" which had been held in October. The substantial work on the preparation of this volume was nearly completed by the end of the year.

It is gratifying to record that the first printing of *Laboratory and Workshop Notes*, by Dr. Ruth Lang, was sold out and it was reprinted during the year. A further selection of the Notes from the *Journal of Scientific Instruments* which she had been invited by the Board to prepare was sent to press for publication by the same firm in 1951. The royalties from these volumes are credited to the Institute's Benevolent Fund.

The Board authorized the X-ray Analysis Group to commission a volume *X-ray Diffraction by Powder and Polycrystalline Materials* to which some 25 authors are being invited to contribute. This will be published by the Institute.

Notes on the Preparation of Papers.—A revised and enlarged edition of *Notes on the Preparation of Contributions to the Institute's Journals and other Publications* was published during the year by the Institute at 2s.

Professional Matters

The annual Conference of Branch and Group Officers proposed to the Board that the Institute's professional activities should be further developed and should include a greater interest in the economic status of physicists, particularly those who were teachers in schools. At the same time the executive officers reported that they had dealt with a growing number of inquiries from members and others, about salaries, conditions of service, consulting fees, insurance and radiation hazards, professional training and similar matters, and had always been able to obtain guidance in cases of doubt from the Honorary Officers or other members with special knowledge. The Board was satisfied with the present method of dealing with individual cases in confidence, particularly as those who had sought advice were appreciative and satisfied.

Teachers in Schools.—The Education Committee made recommendations, which the Board accepted, for helping to improve the economic status and general conditions of teachers of physics in schools. It was also decided to keep in close touch on this matter with other professional institutions of scientists interested and with the Parliamentary and Scientific Committee.

Salary Statistics.—The Board ordered a new inquiry to be made of Members about their remuneration in order to provide up-to-date statistical data, similar to that obtained in 1948, on which to base replies to inquiries regarding salaries. The data will be published in statistical form.

Contracts of Service.—Work on the preparation of a new set of notes on terms of engagement suitable for physicists was begun. These will be available to Members in 1951 and will concern such items as patent rights, conditions under which consulting work may be undertaken, length of notice required and annual leave.

Careers in Physics.—The Institute receives many inquiries about careers in physics, each of which at present is answered individually. The number of inquiries has however grown so large that the Board requested the Deputy Secretary, with the general guidance of the Education Committee, to write a pamphlet on this subject.

Appointments Register.—At the beginning of the year the Board suspended the operation of the Appointments Register which it was felt was no longer suited to present circumstances in which employers find difficulty in suitably filling vacancies for physicists. Notices of vacancies have been included in the monthly *Bulletin* and, from the steadily increasing demand of employers for space, it appears that this procedure is generally satisfactory. It appears that the present arrangement, whereby vacancies are widely publicized and members and employers may obtain personal advice when required, is satisfactorily meeting the general need.

The Institute, Parliament and the Ministries

Ministry of Education.—Committees of the Board and the permanent officers of the Institute have continued to have close contact with officials of the Ministry of Education on many matters concerning technical and scientific education. The Board's attitude to the Ministry's proposals for development of technological education is referred to elsewhere in this report.

Wireless Telegraphy Act.—The Board learned with pleasure that the names of Dr. T. E. Allibone and Dr. S. Whitehead (both Vice-Presidents) had been included in the panel of advisers set up under the Wireless Telegraphy Act of 1949. They had agreed to watch the interests of experimental physicists.

Ministry of Fuel and Power.—The Board was unable to accept an invitation from the Ministry of Fuel and Power to assist it in finding part-time examiners to verify the calorific value of gas by spot tests. The Board informed the Ministry that, in its view, the fees and travelling expenses allowed were considerably below those that would make it possible for the Institute to invite qualified physicists to apply for these vacancies.

Conference on "Some Aspects of Fluid Flow"

The Board accepted the suggestion of the British Iron and Steel Research Association that the Institute should organize a Conference on "Some Aspects of Fluid Flow." This took place at Ashorne Hill, the House of the British Iron and Steel Federation, near Leamington Spa, from October 25th–28th. It was attended by some 150 people of whom about one-third were members of the Institute. The papers presented and a summary of the proceedings of the discussion groups is being published. The Conference served to bring together some of those working on fundamental problems and those concerned with the applications of this knowledge, especially in industry: it demonstrated the need for much more fundamental work on this difficult subject.

The Institute's House

The meeting and committee rooms have been in increased use during the year as the following figures show (1949 figures are given in brackets).

Institute Meetings

Board and Committee meetings (including Branch and Group Committees)	78 (46)
Lecture meetings and conferences	28 (18)

Other Meetings

The rooms have also been used by other bodies as follows:—

Committee Meetings	26 (21)
Lecture Meetings	3 (3)

In addition, the facilities of the House have been used for several social occasions, the principal of which were a reception by the Institute to distinguished foreign physicists attending the International Congress of Radiology, and a social evening held in connexion with the Annual Conference of Branch and Group Officers.

Library Facilities

The facilities offered through the Institute for the loan of books and periodicals from the Science Museum Library have again been well used although the demand for the use of the Joint Library of the Institute and the Physical Society, housed partly in that Society's rooms, in South Kensington, and partly at Belgrave Square, has been small.

An arrangement which appears to be well appreciated by members has been made, at the invitation of the Board, with H. K. Lewis Ltd., scientific booksellers, who maintain for inspection a selection of recent scientific and technical books in the Members' Room in the Institute's House.

Relations with the American Institute of Physics

During his term of office as President, Dr. F. C. Toy visited America and personally conveyed the Institute's greetings to the American Institute of Physics. The two Institutes have kept in constant touch during the year, through the Director of the American Institute of Physics, Dr. H. Barton and the Secretary of our own Institute. The Board again records its thanks to Dr. Barton for advice and assistance to members who have visited America during the year.

Annual Conference of Branch and Group Officers

The seventh annual Conference of Branch and Group Officers was held in the Institute's House on May 17th, the President being in the chair. There was a frank discussion on various matters raised by the Branch and Group Committees and a number of recommendations were made to the Board. A brief account of the Conference was included in the July issue of the *Bulletin*.

Activities of the Branches and Groups

Australian Branch.—President: Dr. G. H. Briggs. *Honorary Secretary:* Mr. F. J. Lehany. *Honorary Treasurer:* Mr. A. J. Higgs (325 members).

The five divisions in the different States held 33 meetings for lectures and discussions, including addresses by distinguished visitors. The Branch held a four-day conference on "Photometry and its Applications" in Sydney in November. Twenty-three papers were read and eighty people attended. The programme included a visit to the National Standards Laboratory and an Exhibition of Photometric Instruments.

The Branch was represented on the Australian National Committee on Illumination and on the National Co-operating Body for Natural Sciences for U.N.E.S.C.O. by Dr. G. H. Briggs, and on the Joint Committee of Professional Bodies by Dr. C. E. Eddy.

Indian Branch.—President: Sir C. V. Raman. *Honorary Secretary:* Dr. H. P. Waran (80 members).

The Committee of the Branch has continued to assist the Membership Committee by advising upon applications received from India.

London and Home Counties Branch.—Chairman: Dr. H. Lowery succeeded by Dr. A. J. Maddock. *Honorary Secretary:* Dr. H. L. Penman (1 650 members).

The Branch held five lecture meetings and arranged visits to the laboratories of the British Scientific Instrument Research Association and to the physics department of the Middlesex Hospital Medical School. The Summer Meeting was held at the National Institute for Research in Dairying at Shinfield, near Reading.

Manchester and District Branch.—Chairman: Prof. F. A. Vick. *Honorary Secretary:* Dr. A. Hargreaves (500 members).

Six lecture meetings were held in Manchester and one, in co-operation with the Huddersfield section of the Royal Institute of Chemistry, in Huddersfield. This year the usual summer conference, in Manchester, was arranged in collaboration with the British Rheologists' Club on "The Physics of Lubrication" and the proceedings are to be published in full by the Institute as a supplement to the *British Journal of Applied Physics*.

Midland Branch.—Chairman: Dr. D. Parkinson. *Honorary Secretary:* Mr. W. C. Hynd (320 members).

The Branch held seven lecture meetings in Birmingham. A two-day conference on "Vacuum Physics," also in Birmingham, was held in the summer, an exhibition of vacuum equipment being arranged in conjunction with it. The proceedings of the conference are to be published by the Institute.

Scottish Branch.—Chairman: Professor P. I. Dee succeeded by Professor J. S. Rankin. *Honorary Secretary:* Dr. J. M. A. Lenihan (270 members).

Seventeen lecture meetings were held, seven being in Glasgow, six in Edinburgh, two in Aberdeen and two in Dundee. A course of fifteen weekly lectures on "Atomic and Nuclear Physics" was held at the University of Glasgow; the lectures were given by four Fellows and attendance was limited to members of the Institute. A course of six lectures on Industrial and Medical Applications of Atomic Physics was also held at University College, Dundee.

South Wales Branch.—Chairman: Professor F. Llewellyn Jones succeeded by Dr. T. V. Starkey. *Honorary Secretary:* Dr. T. V. Starkey succeeded by Mr. M. R. Hopkins (200 members).

The Branch held four meetings in Cardiff, one of which was held jointly with the Education Group, one meeting in Swansea and one in Aberystwyth.

North-Eastern Branch.—Chairman: Professor G. W. Todd succeeded by Mr. H. G. Yates. *Honorary Secretary:* Dr. N. Thorley (135 members).

This was the first year of the Branch's existence and four meetings were held, three in Newcastle-upon-Tyne and one in Sunderland.

Education Group.—Chairman: Mr. W. Somerville Vernon. *Honorary Secretary:* Dr. J. Topping (230 members).

The Group held two meetings in London (one jointly with the Education Discussion Circle of the Institution of Electrical Engineers) and one in Cardiff in conjunction with the South Wales Branch. A three-day Conference was also held at the Institute's House on "Physics in Schools" and a summer meeting was held at Harrow School.

Electronics Group.—Chairman: Mr. H. G. Hughes. *Honorary Secretary:* Mr. G. W. Warren (295 members).

The Group held eight lecture meetings and also held a summer meeting on "Gas Discharge Tubes." In addition there was a visit to the laboratories of Electric and Musical Industries Ltd., at Hayes, Middlesex.

Electron Microscopy Group.—Chairman: Dr. A. S. McFarlane succeeded by Professor W. T. Astbury. *Honorary Secretary:* Mr. F. W. Cuckow (220 members).

In collaboration with the Royal Microscopical Society the Group organized a four-day International Congress on Microscopy in Newcastle-upon-Tyne. For its autumn meeting the Group took part in the eight-day International Congress of Electron Microscopy in Paris.

Industrial Radiology Group.—Chairman: Mr. W. J. Wiltshire succeeded by Mr. C. Croxson. *Joint Honorary Secretaries:* Dr. J. Chaston succeeded by Mr. B. N. Clack, and Mr. P. Rowbotham (220 members).

The main event of the year was a five-day summer meeting and exhibition held in London in association with the Sixth International Congress of Radiology. Four other lecture meetings were held during the year. The Group has eight sub-committees whose contribution included memoranda on the training of industrial radiographers and on radiological units, together with the publication of a 2nd edition of the *Handbook of Industrial Radiology*. The Committee continued to assist in efforts towards standardization of radiological equipment and terminology.

Industrial Spectroscopy Group.—Chairman: Mr. D. M. Smith. *Honorary Secretary:* Mr. E. Van Someren succeeded by Mr. K. Dixon (135 members).

The Group held two lecture meetings and a symposium in London and one meeting in Sheffield.

Stress Analysis Group.—Chairman: Col. H. T. Jessop. *Honorary Secretary:* Mr. E. K. Frankl (130 members).

Five discussion meetings were held in London and a visit was arranged to the photoelastic laboratory of the Engineering Division of the National Physical Laboratory. A three-day conference was held in London at which twelve papers were read and a Summer School in "Electric Resistance Strain Gauge Techniques" was held at Cambridge.

X-Ray Analysis Group.—Chairman: Mr. D. A. Oliver succeeded by Dr. W. H. Taylor. *Honorary Secretary:* Mr. A. E. De Barr (280 members).

As usual the Group arranged two Conferences, both in London. The Spring Conference was devoted to

"The Production and Application of High Intensity X-ray beams" and the autumn one to "The Development and Application of Fourier Methods in Crystal Structure Analysis."

Copies of the revised card index of diffraction data published by the American Society for Testing Materials have been received and are being sold by the Institute. Work on the extension of the data has continued at University College, Cardiff, and has been supported by the proceeds of the sale of the index.

The Equipment Sub-Committee and its Panels have continued their work and user specifications for a microdensitometer for X-ray powder photographs and a high-temperature X-ray powder camera have been published. As the result of an inquiry made among Group members, arrangements have now been made for the production and sale through the Institute of a further selection of charts for X-ray crystallography.

Acknowledgments

Branch and Group Officers.—The Board wishes to record its thanks to those members who have contributed so much to the successful programme of meetings and visits by acting as Honorary Officers of the Institute's Branches and Groups.

Meeting Rooms and Visits.—The Board records its thanks to the following bodies, which have generously allowed meetings of the Institute's Branches and Groups to be held on their premises: The Royal Institution; the Royal Society of Tropical Medicine and Hygiene; the British Institute of Radiology; the Institution of Electrical Engineers; the British Iron and Steel Corporation, Ashorne Hill; the Universities of Aberdeen, Birmingham, Edinburgh, Glasgow, Manchester and Sheffield; Kings' College, Newcastle-upon-Tyne; the University Colleges of Aberystwyth, Cardiff, Dundee and Swansea; University College, London; the Heriot-Watt College; the Polytechnic, Regent Street; Sunderland Technical College, Huddersfield Technical College, Cardiff Technical College.

The Board also records its thanks to the Headmaster of Harrow School and to the Directors of the following for allowing visits to their laboratories: the National Institute for Research in Dairying, Shinfield; the British Scientific Instrument Research Association, Chislehurst; the National Physical Laboratory, Teddington; the Dunlop Rubber Company Ltd., Birmingham, and the Middlesex Hospital Medical School, London.

Finance

Last year it was reported that "the growing commitments of the Institute in relation to its income and diminishing capital" was causing anxiety; this led to members agreeing to a substantial increase in their subscriptions from January 1, 1950, and to increases in the price of the Institute's Journals, partly with a view to bringing the reserves above the dangerously low level to which they had sunk. The first year of this policy is reflected in the accounts.

The 1950 accounts are presented in substantially the same form as in previous years, but the separate Publications account has been omitted and the transactions on this account embodied in the Endowment Trust Fund account. This is in accordance with the Board's decision to divide the Institute's work for accountancy purposes into the two broad groups defined in its Memorandum of Association which provided for its incorporation, namely, (i) the elevation of the profession of physicist (covered by the Institute accounts) and (ii) the advancement and diffusion of a knowledge of physics, pure and applied (covered by the Endowment Trust Fund account). The objects of the Fund (which has been accepted by the Commissioners of the Inland Revenue as a charity), include educational work, publications and scientific meetings. The new arrangement should help to clarify the position in regard to income tax liability of any surplus on the publications about which there has been considerable correspondence.

In accordance with modern practice the figures have been approximated to the nearest pound.

Institute of Physics Accounts.—It will be noted that members' subscriptions for 1950 were £9,373, showing an increase of £3,523 as compared with the previous year; the Board is grateful to Mr. R. S. Whipple for his donation of £100 to the Furnishing Fund. The total income on this account at £10,813 has increased by £3,945 and the expenses were £8,411 compared with £8,045 last year. The surplus of income over expenditure for the year was £2,402 compared with a deficiency on the year's working of £1,177 for the previous year. In the second section of the Institute's Income and Expenditure account the surplus is reduced by the deficit brought forward from last year, £1,016, and after charging the first premium on the Leasehold Redemption Policy of £985, £401 remained, of which £400 has been transferred to the General Reserve and £1 carried forward. The Leasehold Redemption Policy matures at the expiry of the lease of the House in 1983 and is for £40,000, which should provide substantially towards a new home for the Institute.

The Institute's balance sheet shows again the need to increase the Reserve Fund which stands at £2,079 only. The current assets at the end of the year were £5,484. The current liabilities of £12,219 included the subscriptions (members and journals) paid in advance for 1951, the money held in trust for the X-ray Analysis Group for the Index (see Appendix), and the balance still due from the Institute's account to the Endowment Trust Fund. The items covered by "for expenses" include various items due at the end of the year but not paid until early in 1951 and £600, being the balance due to the Endowment Trust Fund for writing off on the House account, and £759 due for transfer to the Benevolent Fund.

Endowment Trust Fund Accounts.—Apart from the inclusion of the costs and sales of the Publications, the Endowment Trust Fund accounts have been prepared

on the same lines as in previous years. It will be noted that the final deficiency on this account for the year is shown at £767 (compared with £1,053 for the previous year). At the end of the year the Trust Fund stood at £6,039. Provision has been made on the Endowment Trust Fund account for £300 as contribution towards the cost of repairs and alterations. The Board wishes to record its thanks to those firms who have made further donations to the Fund during the year, and to the Royal Society for a subvention of £500 from the Parliamentary Grant-in-Aid for Scientific Publications. It is gratifying to note that whereas when the Fund was opened in 1946 it was expected that it would be drawn on at the rate of about £2,000 p.a. the actual net figures have been considerably less.

Benevolent Fund

The Fund received a generous gift of £500 from Mr. R. S. Whipple. The income from other donations was a little larger than in previous years. On the other hand royalties from sale of books were quite small as those for the 1950 sales were received too late for inclusion.

An Associate who had been receiving a weekly allowance of £3 since February, 1944, died in February, 1950. A weekly allowance made to the widow and children of an Associate was continued at a reduced rate.

The Committee wishes to record its thanks to those who have made donations during the year and takes this opportunity of urging other members to support this Fund.

APPENDIX

Reports from the Institute's representatives on the work of various Committees during 1950.

Royal Society's Information Services Committee—Sub-Committees.—One meeting of a Committee of Editors of chemical and physical journals was held when there was a useful exchange of views on matters of common interest, including the appropriate sphere for each journal, the preparation of scripts and difficulties in the printing industry. It was decided that as most editors were already in touch with one another on an informal basis, there was no necessity to set up a permanent committee of editors.

The special sub-committee which had been set up to prepare *General Notes on the Preparation of Scientific Papers* completed its work and the pamphlet was published for the Royal Society by the Cambridge University Press. It was warmly welcomed as an important contribution towards the improvement of scientific literature.

Parliamentary and Scientific Committee.—During the Parliamentary session the General Committee met six times and on each occasion heard a series of important addresses by leading scientists and others on matters of national interest. Amongst the subjects dealt with were the work and future plans of the Department of Scientific and Industrial Research, scientific liaison between the Commonwealth countries, Productivity and the work of the Advisory Council on Scientific Policy.

During the course of the year, the Chairman of the Committee was fortunate in drawing the first place in the ballot for Private Members' Motions, with the result that on May 5th he was able to initiate a whole day's debate on the Utilization of Britain's Scientific Resources. The terms of the motion which Mr. Price put before the House and which were agreed to without question at the end of the debate, were:—

"That in the opinion of this House, there should be the fullest development and utilization of Britain's exceptional scientific resources and manpower, with a view to ensuring effective progress in the development of our industry, agriculture and Colonies, and a material improvement of our economic position in the world."

Of the 17 Members who spoke in the debate, no less than 13 were members of the Parliamentary and Scientific Committee. Contributions were also made from the Front Opposition bench and a lengthy reply was given by the Lord President of the Council.

Prior to May 5th, all organizations belonging to the Parliamentary and Scientific Committee were invited to submit points which might be raised during the course of the debate and a great deal of this material was usefully employed. In concluding the debate, the Lord President of the Council said that he hoped that it would have a beneficial effect upon the whole scientific world so that scientists would realize that the House of Commons was interested in their work and wished them well.

The sub-committee appointed to prepare a report on the education of technicians in industry completed its work; the report was accepted by the General Committee and published under the title *Technical Education and Skilled Manpower*. Among the recommendations were increased day-release from industry to attend technical colleges, development of the technical element in secondary modern schools, a greater number of secondary technical schools and improved salaries and conditions for technical college staffs.

Joint Council of Professional Scientists.—During the year the Council was reconstituted to give each of the following four Institutes three seats on it: the Institute of Biology, the Royal Institute of Chemistry, the Institution of Metallurgists and the Institute of Physics. As there are at present no professional bodies representing geologists or mathematicians, one member of each of these professions is co-opted.

The Joint Council, in its capacity of a joint consultative body, discussed various professional matters which had been referred to it by the constituent bodies These included public relations of scientists and the status and salaries of science teachers.

Blackburn Technical College Science Advisory Committee.—The Committee received and discussed a report from the Head of the Science Department. It was decided to explore the possibilities of running a course

for Laboratory Technicians based on the City and Guilds of London Institute syllabus.

Applied Science Advisory Committee, Royal Technical College, Salford.—The Committee considered reports from the Heads of the Chemistry and Physics Departments. Plans for a new building, which will include some 10 000 sq ft for the Physics Department, were submitted. The Committee considered that there was room for research in applied physics in the college.

Joint Committee on Chemical Analysis by X-Ray Diffraction Methods.—The Joint Committee of the American Society for Testing Materials, American Crystallographic Association and the Institute of Physics finished its complete revision of the card-file of X-ray diffraction data arranged in form for use in chemical analysis. In addition to the card-file of some 4 000 cards, the Joint Committee completed two types of indices which make the card-file more convenient to use. One index is of the key-sort type in which cards may be quickly and easily sorted by the use of a needle and a system of punched holes arranged around the perimeter of each card. The other index is in two parts, (*a*) a numerical index and (*b*) an alphabetical index. These two indices have been printed and bound in a book of some 700 pages. The numerical and alphabetical indices are cross-referenced so that it is easy for the user to find his way around in it. The Joint Committee reports that in preparing lists of X-ray diffraction data, the work of Dr. A. J. C. Wilson, University College, Cardiff, who acts on behalf of the X-ray Analysis Group of the Institute, has been outstanding. Work on the third supplementary set of index cards is progressing rapidly.

British Committee for Radiological Units.—Prior to the meeting of the International Commission on Radiological Units at the International Congress of Radiology held in London in July, the British Committee put forward a memorandum to be used as a basis of international agreement on the subject of radiological units. It was recommended that, as the factor of fundamental importance in the correlation of the quantity or dose of any ionizing radiation with its biological or other effects is the energy absorbed per unit mass of irradiated material, a new unit of dose of ionizing radiation be adopted, expressed in ergs per gramme of absorbing medium. In general, direct calorimetric measurements are not possible and ionization methods will have to be employed, as hitherto. The translation to ergs of the ionization produced per unit mass in a gas by the same flow of corpuscular radiation as exists in the material under consideration, requires a knowledge of the energies expanded by the ionizing particles per ion pair formed in the gas and also of the radio of the mass stopping power of the material to that of the gas.

The international Commission agreed to adopt such a unit, whilst retaining the röntgen as a unit of X-ray and gamma-ray quantity for quantum energies up to 3 MeV. The Commission also recommended a re-definition of the curie, in accordance with the views of the International Union for Pure and Applied Physics.

The Royal Society's Paul Instrument Fund Committee.—This Committee has been very active and has made grants to six or seven workers on new or improved types of instruments. Its annual commitment amounts to several thousand pounds.

British Standards Institution Committees

Instrument Industry Standards Committee.—The Committee reviewed proposals for new work and had before it many reports from its sub-committees dealing with the standardization of terminology and symbols and the design of certain classes of instruments and auxiliary equipment.

Technical Committee on the Radiographic Examination of Welded Joints.—The draft techniques of weld radiography have been examined by the main Committee and referred back to the drafting panel for modification in the light of the main Committee's comments.

Technical Committee on Electric Nomenclature and Symbols.—The main work of this Committee has been the revision of glossaries of terms used in wave-guide techniques and in telecommunications. A panel was appointed and reported at the end of the year on the principles to be followed, including a proposal that the two documents should be combined. The Panel is proceeding with this work. Some discussion took place on the choice and definition of the 4th fundamental unit for the M.K.S system in view of the forthcoming I.E.C. meeting to consider international agreement on the matter.

Sub-Committee on X-Ray Powder Diffraction Cameras.—The Committee finished its work in February on the specification for the design of X-ray diffraction cameras, having nominal diameters of 9 cm and 19 cm respectively. The final published specification included a number of modifications arising from criticisms and suggestions offered after circulation of a first draft to various industrial and research organizations.

Technical Committee on Barytes.—The Committee met twice during the year. The terms of reference of the Committee are to prepare specifications for barytes for use as an aggregate in plaster and concrete for protection against X-rays, gamma-rays and neutrons. There appeared to be a divergence of opinion on the quality of British barytes as compared with Canadian material, and it was agreed that before drawing up the specification, tests should be carried out on various types of barytes concrete. A programme of such tests has been prepared by the Building Research Station, where the tests will be made.

W. E. CURTIS,
President.

E. R. DAVIES,
Honorary Treasurer.

H. R. LANG,
Secretary.

B. P. DUDDING,
Honorary Secretary.

THE INSTITUTE OF PHYSICS

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST DECEMBER, 1950

1949				£
£				
	To OFFICE AND GENERAL EXPENSES:—			
2,999	Salaries and National Insurance			3,455
199	Staff Superannuation			221
1,475	Rent, Rates, Heating, Cleaning, Maintenance, etc.			1,632
401	Board, Committees' and Officers' Travelling Expenses			397
882	Printing and Stationery			804
431	Postage and Telephone			452
279	Miscellaneous Expenses			241
381	Printing List of Members			—
				7,202
43	„ RESERVE FOR AUSTRALIAN EXCHANGE			—
2	„ DEPRECIATION OF FURNITURE AND FITTINGS			280
853	„ COPIES OF THE JOURNAL SUPPLIED TO MEMBERS			829
	„ AMOUNT WRITTEN OFF EXPENDITURE ON ALTERATIONS, IMPROVEMENT AND ADAPTATION OF HOUSE	£400		
	Less CONTRIBUTION FROM ENDOWMENT TRUST FUND	300		
100				100
Def. 1,177	„ BALANCE, BEING EXCESS OF INCOME OVER EXPENDITURE CARRIED DOWN			2,402
£6,868				£10,813

1949			£
£			
5,850	By MEMBERS' SUBSCRIPTIONS		9,373
435	„ ENTRANCE AND OTHER FEES		678
50	„ DIVIDENDS AND INTEREST LESS TAX		94
541	„ CONTRIBUTION BY THE ENDOWMENT TRUST FUND TOWARDS ADMINISTRATION EXPENSES		568
2	„ FURNITURE AND EQUIPMENT FUND DONATIONS		100
£6,868			£10,813

			£
Def. 160	To BALANCE BROUGHT FORWARD FROM PREVIOUS YEAR		1,016
—	„ LEASEHOLD REDEMPTION POLICY		985
—	„ GENERAL RESERVE		400
Def. 1,017	„ BALANCE CARRIED DOWN		1
Def. £1,177			£2,402

		£
Def. 1,177	By BALANCE BROUGHT DOWN	2, 402
Def. £1,177		£2,402

BALANCE SHEET, 31st DECEMBER, 1950

1949 £		£	£
	LIFE MEMBERSHIP FUND:—		
	As on 31st December, 1949	5,242	
	Less Transfer to Reserve Fund in respect of deceased members	32	
5,242			5,210
	RESERVE FUND:—		
	As on 31st December, 1949	1,647	
	Add Transfer from Life Membership Fund	32	
	Transfer from Income and Expenditure Account	400	
1,647			2,079
	SINKING FUND (Leasehold Property)		985
Def. 1,016	INCOME AND EXPENDITURE ACCOUNT: Balance		1
	CURRENT LIABILITIES AND PROVISIONS:—		
2,839	General and Publication Subscriptions received in advance	3,556	
529	X-Ray Diffraction Index	3,654	
3,915	Endowment Trust Fund	2,489	
4,721	For Expenses	2,520	
			12,219
£17,877			£20,494

W. E. CURTIS,
President.

E. R. DAVIES,
Honorary Treasurer.

1949 £		£	£
	FIXED ASSETS:—		
	FURNITURE, FITTINGS AND OFFICE EQUIPMENT:—		
	At cost	3,392	
	Additions during the year	341	
		3,733	
	Less Amounts written off to date	1,732	
1,939			2,001
	ALTERATIONS, IMPROVEMENTS AND ADAPTATION OF PREMISES:—		
	At cost	8,099	
	Additions during the year	833	
		8,932	
	Less Sales and amounts written off	1,744	
6,755			7,188
	INVESTMENTS:—		
	£500 3% Defence Bonds	500	
	£1,000 3% Savings Bonds, 1960–70	1,000	
	£500 2½% Defence Bonds	500	
	£660 13s. 7d. 3½% Commonwealth of Australia Stock, 1965–69	737	
	£200 Commonwealth of Australia Savings Certificates	152	
	£1,820 3½% Commonwealth of Australia Victory Bonds	1,467	
	£600 3½% Commonwealth of Australia Bonds	480	
4,832			4,836
	(*Market Value at 31st December, 1950, £4,562.*)		
	Sinking Fund:		
	Leasehold Redemption Policy		985
	CURRENT ASSETS:—		
1,207	STOCKS ON HAND:—Publications	—	
283	Stationery	376	
1,276	SUNDRY DEBTORS	1,789	
69	SUBSCRIPTIONS DUE	212	
1,369	CASH AT BANK:—Current Account	2,264	
5	Deposit Account	5	
84	In Australia	774	
58	CASH IN HAND	64	
			5,484
£17,877			£20,494

Report of the Auditors to the Members of the Institute of Physics

We have obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purpose of our audit. In our opinion proper books of account have been kept by the Institute, so far as appears from our examination of those books and proper returns adequate for the purposes of our audit have been received from branches of the Institute not visited by us.

We have examined the above Balance Sheet and annexed Income and Expenditure Account which are in agreement with the books of the Institute.

In our opinion and to the best of our information and according to the explanations given to us the said accounts give the information required by the Companies Act, 1948, in the manner so required and the Balance Sheet gives a true and fair view of the state of the Institute's affairs as at 31st December, 1950, and the Income and Expenditure Account gives a true and fair view of the excess of income over expenditure for the year ended on that date.

Spencer House, South Place, London, E.C.2.
20th February, 1951.

KNOX, CROPPER & CO., *Chartered Accountants.*

THE INSTITUTE OF PHYSICS ENDOWMENT TRUST FUND

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st DECEMBER, 1950

1949		£
£		
132	To Laboratory Arts and National Certificate examinations ..	171
688	„ Expenses of branches and groups	1,396
462	„ Conference expenses	145
24	„ Educational booklets and reports	120
10,971	„ Production and distribution of publications	14,572
5	„ Professional charges	5
	„ Contribution to cost of repairs and alterations of house—amount written off	300
300	„ Proportion of overhead charges in connection with the work	
541	carried on by the Trust	568
36	„ Loss on sale of investments	—
£13,159		£17,277

1949		£
£		
103	By Fees for Laboratory Arts and National Certificates ..	131
564	„ Donations	411
109	„ Interest	49
10,380	„ Receipts from publications	15,419
950	„ Scientific publications grant (per Royal Society)	500
1,053	„ Balance carried to Endowment Trust Fund	767
£13,159		£17,277

BALANCE SHEET, 31st DECEMBER, 1950

	£	£
ENDOWMENT TRUST FUND:—		
As on 31st December, 1949	6,806	
Less Transfer from Income and Expenditure Account	767	
		6,039
SUNDRY CREDITORS:—Publications		2,643
W. E. CURTIS, *President.*		
R. R. DAVIES, *Hon. Treasurer.*		
		£8,682

	£	£
INVESTMENTS:—		
£400 3% Savings Bonds, 1965–75	400	
£1,500 2½% Defence Bonds	1,500	
		1,900
(*Market Value at 31st December, 1950, £1,888.*)		
PROPORTION OF ALTERATIONS, ETC., OF PREMISES:—		
Payable by the Trust Fund as on 31st December, 1949	900	
Less Amount written off this year	300	
		600
STOCK ON HAND:—Publications		2,035
SUNDRY DEBTORS:—Publications		1,566
INCOME TAX RECOVERABLE		92
DUE FROM THE INSTITUTE OF PHYSICS		2,489
		£8,682

We have audited the above Balance Sheet and have obtained all the information and explanations we have required. We have verified the Bank balances and the investments. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Fund according to the best of our information and the explanations given to us and as shown by the books of the Fund.

Spencer House, South Place, London, E.C.2.
20*th February*, 1951.

KNOX, CROPPER & CO., *Chartered Accountants.*

THE INSTITUTE OF PHYSICS BENEVOLENT FUND

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST DECEMBER, 1950

1949		£	1949		£	£
£			£			
413	To Grants	289	228	By Subscriptions and Donations	476	
39	„ Balance carried to Capital Account	744		„ Special Donation	500	
						976
			44	„ Interest		44
			180	„ Royalties on Books		13
£452		£1,033	£452			£1,033

BALANCE SHEET, 31ST DECEMBER, 1950

	£	£		£	£
CAPITAL ACCOUNT:—			INVESTMENTS at cost:—		
As on 31st December, 1949	1,263		£350 3½% War Stock	350	
Add Transfer from Income and Expenditure Account	744		£750 4% Consols	832	
		2,007	*(Market Value on 31st December, 1950, £1,099.)*		1,182
E. R. DAVIES,			CASH ON DEPOSIT at Post Office Savings Bank		58
Chairman of the Fund.			INSTITUTE OF PHYSICS		760
H. R. LANG,			INCOME TAX RECOVERABLE		7
Secretary of the Fund.					
		£2,007			£2,007

We have audited the above Balance Sheet and have obtained all the information and explanations we have required. We have verified the Bank balances and the investments. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Fund according to the best of our information and the explanations given to us and as shown by the books of the Fund.

Spencer House, South Place, London, E.C.2.
20th February, 1951.

KNOX, CROPPER & CO., *Chartered Accountants.*

The Register

ELECTIONS TO MEMBERSHIP

An asterisk (*) indicates transfer from another grade.

Fellows

*Anderson, Samuel Leslie, B.Sc., Head of Testing Department, Wool Industries Research Association, Leeds.
*Clarke, Norman, B.Sc., Deputy Secretary, The Institute of Physics.
*Das, Mathura Mohan, B.Sc., Lecturer in Physics, Mining and Technical College, Wigan.
Pugh, Hubert Lloyd David, B.Sc., Principal Scientific Officer, Department of Scientific and Industrial Research, Road Research Laboratory.
*Sillars, Ronald William, B.A., D.Phil., Research Physicist, Metropolitan-Vickers Electrical Co. Ltd., Manchester.
*Van Someren, Ernest Horace Sebastian, B.Sc., Research Physicist, Murex Welding Processes Ltd., Waltham Cross, Hertfordshire.
*Waring, John Robert Salmond, B.A., Research Physicist, Imperial Chemical Industries Ltd., Manchester.

Associates

Barbanel, Morris, B.Sc., Senior Science Master, Grammar School, Huntingdon.
*Bissett, Ian James Wynn, B.Sc., Research Officer, Division of Forest Products, C.S.I.R.O., Australia.
Brown, Norman, B.Sc., Senior Assistant for Physics, King Edward VII Nautical College, London.
Cato, George Christopher, M.A., Lecturer in Physics, University of Natal, South Africa.
*Corbridge, Derek Edgar Charles, M.Sc., Physicist, Albright and Wilson Ltd., Birmingham.
Cornick, John Albert Francis, B.A., Lecturer in Physics, Technical College of Monmouthshire.
De Silva, Rupawansa Chandrasena, B.Sc., Research Student, Department of Glass Technology, University of Sheffield.
Dyer, William Kenneth, B.Sc., Assistant Project Engineer, S. Smith and Sons (England) Ltd., Cheltenham.
Effat, Kamal Eldin Ahmed, B.Sc., Research Student, University of Birmingham.
*Malcolmson, Richard Donald, B.Sc., Assistant Lecturer in Physics, University of Queensland, Australia.
McNicholl, Malcolm David, B.Sc., Physicist in Charge, Central Testing Laboratory, Department of Works and Housing, Melbourne, Australia.
Thomson, Richard Noel, B.Sc., Senior Development Physicist, Dunlop Rubber Co. Ltd., Birmingham.
Vale, Keith Robert, B.Sc., Geophysicist Grade II, Bureau of Mineral Resources, Australia.
*Youd, Joyce Fairbairn, B.Sc., Editorial Assistant, Butterworths Scientific Publications, London.

Graduates

*Archer, Michael C. Scott, M.A., Research Physicist, Monsanto Chemicals Ltd., Wrexham.
Bendel, David, B.Sc., Physicist Grade I, Commonwealth X-ray and Radium Laboratories, Australia.
Bissett, Douglas Chisholm, B.Sc., Research Student, University College, Dundee.
Blackler, Francis Geoffrey, B.Sc., Scientific Assistant, Mullard Radio Valve Co.
*Boulding, Geoffrey Ramell, B.Sc., Development Engineer, The General Electric Co. Ltd., Coventry.
*Buteux, Richard Harold Barclay, B.Sc., Assistant Technical Officer, Imperial Chemical Industries Ltd.
Chandrasekhar, Bellur Sivaramiah, M.Sc., Research Student, Clarendon Laboratory, Oxford.
*Coates, Alan Cyril, B.Sc., Physicist, Research Laboratories, Kodak Ltd., Middlesex.
Collinge, Douglas, B.Sc., Science Master, Exmouth Grammar School, Devon.
Cook, Julian Cedric, B.Sc., A.R.C.S., Research Student, Imperial College, London.
*Copeland, Pamela Allen, B.Sc., Research Assistant, Evershed and Vignoles Ltd., London.
*Dolan, Henry, B.Sc., Physicist, Radio Gramophone Development Co., Bridgnorth.
*Franks, Albert, B.Sc., Research Student, Birkbeck College, London.
Galton, Alan Christopher, B.Sc., Assistant Technical Officer, Imperial Chemical Industries (Metals Division).
*Hatherton, Trevor, B.Sc., D.I.C., New Zealand National Research Scholar, New Zealand Government.
*Hill, John David, B.Sc., Assistant Experimental Officer, Radar Research and Development Establishment, Malvern.
*Hopkins, Leonard Frank, B.Sc., Assistant Scientist, Bowaters Development and Research Ltd.
*Jennison, Roger Clifton, B.Sc., Research Assistant, Physics Department, University of Manchester.
Jones, John Kenneth, B.Sc., Physicist, Wilmot Breedon Ltd., Birmingham.
*Landau, Clive Sydney, B.Sc., Research Student, University of Melbourne, Australia.
*Leventhall, Hubert Geoffrey, B.Sc., Student, University College, Hull.
*Lord, Peter, B.Sc., Research Student, University of Manchester.
Mallard, John Roland, B.Sc., Demonstrator in Physics, University of Nottingham.
*Margerson, Stephen Nathan Anthony, B.Sc., Radio Engineer, Metropolitan-Vickers Electrical Co. Ltd., Manchester.
*McInally, Michael, B.Sc., Lectureship in Department of Surgery, University of Edinburgh.
*Morgan, Colyn Grey, M.Sc., Research Student, University College of Swansea.
Morrison, Eric James Watson, B.Sc., Research Physicist, English Electric Co., Stafford.
*Patient, Derrick Arnold, B.Sc., Research Physicist, Baird and Tatlock (London) Ltd.
*Preece, William Alfred John, B.Sc., Refinery Physicist, "Shell" Refining and Marketing Co. Ltd.
Rogers, Peter Oliver, B.Sc., Electronic Physicist, Scribbans-Kemp Ltd., London.
*Saunders, Rosemary Dora, B.Sc., Assistant Mistress, Brighton and Hove School for Girls.
*Shaw, Raymond, B.Sc., Research Student, University of Manchester.
Shirley, Derek George, Assistant Experimental Officer, Post Office Research Station.
*Shuttleworth, Eric, B.Sc., Engineer, English Electric Valve Co. Ltd., Chelmsford.
*Smith, George William Rupert, B.Sc., Soil Physicist, Imperial College of Tropical Agriculture, Trinidad.
Smith, Hugh Archer Finn, B.Sc., Research Student, University College of the South-West, Exeter.
Spector, Jack, B.Sc., Spectrographer-Lecturer, Imperial College of Tropical Agriculture, Trinidad.
*Storrar, Donald Alec, B.Sc., Physicist, Research Laboratories, Elliott Brothers Ltd., Hertfordshire.
Swindon, Thomas Norman, B.Sc., Physicist Grade I, Commonwealth X-ray and Radium Laboratories, Melbourne, Australia.
*Thomas, Lancelot, B.Sc., Research Student, University College of Swansea.
*Tildsley, Francis C. J., B.Sc., Research Physicist, Tootal Broadhurst Lee Co. Ltd., Manchester.
*Warren, Hazel Mortimer, B.Sc., Assistant Experimental Officer, Mechanical Engineering Research Organization, Glasgow.
*Welman, William Leonard, B.Sc., Scientific Officer, Medical Research Council.
*Whitfield, Raymond Tyndall, B.Sc., Scientific Officer, Admiralty Research Laboratory, Teddington.
*Wilson, Leonard Gratton, B.Sc., Research Officer, Pyrometry Centre, University of Western Australia.
*Wiltshire, Leonard Charles, M.Sc., Research Physicist, Thorn Electrical Industries Ltd.
*Withers, Frank Edward, B.Sc., Research Physicist, British Insulated Callender's Cables Ltd., London.
*Wolfson, Anthony Samuel, B.Sc., Junior Engineer, Cinema-Television Ltd.
*Ziesing, George Murray, B.Sc., Research Assistant, University of Adelaide, Australia.

Subscribers

Thomas, Roma Irene, Technical Officer, C.S.I.R.O., Australia.
Wallwork, Stephen Collier, Assistant Lecturer, University of Nottingham.

Students

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Beck, A. E., Battersea Polytechnic, London.
Belk, J. A., Battersea Polytechnic, London.
Bryan, D., Imperial College of Science and Technology, London.
Burton, P. L., University College, London.
Clark, L. G. S., Acton Technical College, London.
Cloud, P. R., Battersea Polytechnic, London.
Dunbar, P. H., Loughborough College.
Dunning, E. D., The Polytechnic, Regent Street, London.
Goddard, J. F., The Polytechnic, Regent Street, London.
Healey, E. M., University of Manchester.
Hegan, G. R., University of Manchester.
Holderness, G. R., University of Manchester.
James, D. B. G., University College of Swansea.
Kennedy, P. J., University of Dublin.
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Lamden, R. J., University of Manchester.
Milne, J. M., Royal Technical College, Glasgow.
Newnham, D. J., Battersea Polytechnic, London.
Nowell, A., University of Manchester.
Owen, J. M., Sir John Cass College, London.
Rose, H. C., University of Manchester.
Rubenstein, C., University of Manchester.
Shepherd, T. R. A., Loughborough College.
Smith, G. V., Battersea Polytechnic, London.
Towlson, P. G., Battersea Polytechnic, London.
Whigham, J. W., University of Aberdeen.
Williams, H., University of Manchester.
Zukowski, R. J., Battersea Polytechnic, London.

APPOINTMENTS VACANT

The inclusion of particulars of a vacancy must not be taken to imply that the Institute necessarily approves of the terms offered or that might be offered. Candidates should satisfy themselves that these are satisfactory, and they may always refer to the Institute for advice. A suggested form of contract under which a qualified physicist might reasonably be expected to serve is available on request.

Physicists required for interesting work in the following fields:—

(1) Application of new materials to electronic engineering.
(2) Cathode ray tube development.
(3) Properties of magnetic materials and applications to magnetic tape recording.
(4) Electronic engineering problems, including microwave applications.

The posts are for permanent pensionable staff and carry good salary and prospects. Applicants should have a sound theoretical training with a degree or equivalent and experience in one of these fields, and should write giving full details and quoting ED/35, to Personnel Department, E.M.I. Engineering Development Ltd., Blyth Road, Hayes, Middlesex.

Dunlop have a vacancy for a physicist in the **Textile Research Division** at the Research Centre, Birmingham. Applicants should possess a good honours degree in physics and preference will be given to those with previous research experience. Salary according to age, qualifications and experience. Application in writing quoting ref. A.S.104 to Personnel Manager, Dunlop Rubber Co., ort Dunlop, Erdington, Birmingham, 24.

Physicists and **Electrical Engineers** are invited by the **Ministry of Supply** to apply for the following unestablished appointments at Experimental and Development Establishments, for work on out-door instrumentation. Senior Scientific Officer candidates should be at least 26 years of age and possess a 1st or 2nd class honours degree in Physics and have had at least 3 years' post-graduate research or other approved experience in electronics. Some knowledge of experimental range technique and procedure, particularly technical photography, is desirable. Experimental Officer Class candidates must possess a minimum qualification of Higher School Certificate with physics as a main subject, but other qualifications, e.g. Higher National Certificate in Electrical Engineering would be acceptable. Experience in design of electronic apparatus and interest in technical photography is desirable. Starting salary will be determined on age and an assessment of the successful candidates' qualifications and experience with the ranges—Senior Scientific Officer (minimum age 26)—£670–£860 Provinces. This post carries F.S.S.U. benefits. Senior Experimental Officer (minimum age 35) £705–£895 Provinces. Experimental Officer (minimum age 28) £495–£645 Provinces. Assistant Experimental Officer £230–£490, London—£220–£460 Provinces. Rates for women somewhat lower. Application forms obtainable from Ministry of Labour and National Service, Technical and Scientific Register (K), York House, Kingsway, W.C.2, quoting A 95/51 A. Closing date April 23, 1951.

Physics or Chemistry graduates required to assist in isotopic tracer research (Radioactive elements and Mass Spectrometer). Previous experience in vacuum physics and/or electronics is desirable. The commencing salary will be in the range £300–£450 p.a., and duties are to begin in April if possible, but applicants who will not be available until later in the year will be considered. Applications should be made to the Professor of Physics, Reading University, before 8th May, 1951.

The University of Oxford invites applications for the post of **Senior Lecturer** in **Theoretical Physics** at a stipend in the range £700 × £50 to £1 200. An allowance of £50 per annum for each dependent child is payable. The Lecturer may also earn supervision and tuition fees, and will be required to become a member of the Federated Superannuation Scheme for Universities.

The initial stipend will be fixed with reference to age and qualifications. Applications, giving the names of two referees, should be sent to the Secretary of Faculties, University Registry, Oxford, from whom further particulars may be obtained, not later than 1st May, 1951. The person appointed will be required to take up office on 1st October, 1951.

Design Engineer required by unit of **English Electric Co. Ltd.**, working on important defence project, to undertake detailed design and layout of electromechanical analogue computing devices. Degree or H.N.C. essential and experience of Anti-Aircraft predictors, Magslip applications or the like desirable. Write giving full details and quoting ref. 862 to Central Personnel Services, English Electric Co. Ltd., 24/30 Gillingham Street, London, S.W.1.

Applications are invited for the position as **Graduate Physicist** to take charge of works instrumentation in the **Birmingham District Works** and possibly some of the other Works in the Area. The successful candidate will be required to advise engineers on schemes of instrumentation and to discuss matters critically and knowledgeably with the technical staffs of the instrument makers.

Duties will include maintenance of the accuracy of existing instruments against suitable standards. The successful candidate will be expected to pursue avenues of automatic control; some knowledge of electronics is essential.

The salary for the post will be not less than £595 per annum on commencement, rising by annual increments to a maximum of £720 per annum in accordance with Grade II of the salary scales of the National Joint Council for Gas Staffs.

The appointment will be subject to the provisions of such a superannuation scheme as the Board may, in due course, adopt, and the successful candidate may be required to pass a medical examination.

Applications, giving details of age, qualifications and experience, together with the names of two referees should be addressed to Mr. J. E. Wakeford, Divisional Manager, West Midlands Gas Board, Gas Offices, Edmund Street, Birmingham, 3, to reach him not later than April 24, 1951.

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